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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/699,080	10/26/2000	Philip J. Kuekes	10981967-1	5511

7590 02/11/2005

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EXAMINER	
WILLE, DOUGLAS A	

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 02/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/699,080	KUEKES ET AL.	
	Examiner	Art Unit	
	Douglas A. Wille	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *16-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 16 - 30 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

3. Claim 16 refers to two crossed wires with one having a functional group attached to form a junction but there is no description of how the wires are formed, how the coating is performed or how the wires are brought and held in proximity. No example of a real structure with real materials is given except for a description of now to form a device with crossed metal wires (Figure 5) and it is left up to the reader to invent a representative structure. To provide such a structure would involve considerable design and experimental effort and as such the disclosure is not enabling.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 20 - 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. The claims describe a bipolar junction transistor but if the method described has any meaning at all it can only be regarded as a FET (field effect transistor). Any text describing the physics of semiconductor devices may be consulted but an excellent source is Physics of Semiconductor Devices by Sze (see chapters 3 and 8). A bipolar device has three continuous and contacted regions of material each of which has a specific doping, is separately connected and has a sequence of npn or pnp. A FET on the other hand, has a pnp (or npn) structure where a gate is provided to induce charge in the field region between the source and the drain. The structure describe in the specification can only be described as a FET.

Claim Rejections - 35 USC § 102

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 16 - 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Meyer et al.

9. With respect to claim 16, Meyer et al. show a quantum effect device (see cover Figure, Figure 3a, Figure 4 and column 3, line 50 et seq.) with crossed quantum wires where one wire is a semiconductor and the other wire may be regarded as the metal gate 32 or a combination of the metal gate and a part of the semiconductor layers. Note that since the semiconductor layers transfer charge due to the band offset effects, they perform modulation doping and are effectively the functional group. Note that all materials are either a Lewis acid or base.

10. With respect to claims 17 and 18, the spacing is inherently nanoscopic.

11. With respect to claims 19, 23 and 27, the quantum wire is a semiconductor which can be either polarity and the gate, as is standard in the art, can be a metal or a doped semiconductor

with the selection being determined by the required work function and is a matter of design choice.

12. With respect to claims 20 - 22, the gate structure will induce a region of opposite type under it and therefore defines a pnp or npn structure.

13. With respect to claim 24, the gate will induce a channel region. Note that a gate region is as region where a gate is located and it appears that applicant is referring to a channel region rather than a gate region.

14. With respect to claims 25 and 26, either polarity can be used and both n-channel and p-channel devices are standard in the art.

15. With respect to claim 28, the limitation is a functional limitation which does not carry weight in a claim drawn to a method.

16. With respect to claims 29 and 30, Meyer et al. shows a transistor and a switching function is inherent in a transistor.

17. Claims 16 - 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Frazier et al.

18. With respect to claim 16, Frazier et al. show a quantum effect device (see Figure 3, and column 7, line 20 et seq.) with a quantum wire 86, 90,92 and a wire 96 where one wire is a semiconductor and the other wire is a metal gate; however, the gate, as is standard in the art, can be a metal or a doped semiconductor with the selection being determined by the required work function as is a matter of design choice. Note that since the semiconductor layers transfer charge due to the band offset effects, they perform modulation doping and are effectively the functional group. Note that all materials are either a Lewis acid or base.

19. With respect to claims 17 and 18, the spacing is inherently nanoscopic.

20. With respect to claims 19, 23 and 27, the quantum wire is a semiconductor which can be either polarity and the gate, as is standard in the art, can be a metal or a doped semiconductor with the selection being determined by the required work function as is a matter of design choice.

21. With respect to claims 20 - 22, the gate structure will induce a region of opposite type under it and therefore defines a pnp or npn structure.

22. With respect to claim 24, the gate will induce a channel region. Note that a gate region is as region where a gate is located and it appears that applicant is referring to a channel region rather than a gate region.

23. With respect to claims 25 and 26, either polarity can be used and both n-channel and p-channel devices are standard in the art.

24. With respect to claim 28, the limitation is a functional limitation which does not carry weight in a claim drawn to a method.

25. With respect to claims 29 and 30, Frazier et al. show a transistor and a switching function is inherent in a transistor.

Response to Arguments

1. Applicant's arguments filed 7/15/04 have been fully considered but they are not persuasive.

2. Some of Applicant's arguments are moot in view of the new rejection and may not be addressed in what follows.

3. Applicant refers to 09/282,048 as showing a method of forming the claimed devices. The example shown at column 10, line 42 is applied to metal wires and could, in principle be

extended to other material and is accepted as a formation method. However, Applicant refers to the articles by Heath et al. and Morales et al. as useful formation methods but note that show a method of forming a quantum and there is no method shown for crossing two such wires or in making necessary electrical connection to such wares and these articles are certainly not enabling for the claimed device formation method.

4. Applicant states that Examiner, at page 10, 5th paragraph is not examining the application based on claim language but it is not possible to associate any meaning with this phrase and it is not explained by Applicant.

5. Applicant states that quantum wires are not being considered, only nanoscopic wires. There is no difference.

6. On page 10 Applicant states that to evaluate this Application Examiner must have a Ph.D. and direct experience with the field. While Examiner could have a Ph.D., Examiner, by definition, could not have direct experience in the field since Examiner is being employed as an Examiner. This appears to state that no Examiner is qualified to judge the Application. Is that the case?

7. Applicant states that the Meyer et al. device depends on resonant tunneling and that Applicant's device is a transistor. First, note that the Meyer et al. device is a transistor (see the title and note that there is a gate). Second, it is common in the semiconductor art to provide an EEPROM transistor device that depends on Fowler-Nordheim tunneling (see Sze at page 496-7). Such a device is a transistor and employs tunneling and thus tunneling is not a bar to transistor action. Further, note that Applicant's example (column 10, line 42 of patent 6,459,095 which

resulted from Application 10/282,048) describes a tunneling device (see also Figure 5 of the patent which describes the tunneling conditions.

8. Applicant states that Meyer et al. does not describe a Lewis acid or base but note that everything is either a Lewis acid or base. Note also that semiconductors and indeed, all materials have dangling bonds at the surface which can be passivated. In the case of silicon, for instance, dangling bonds are passivated with hydrogen which is a proton and is the basis of the Bronsted-Lowry definition which is included in the Lewis definition (see any chemistry text).

9. Applicant states that Frazier et al. does not describe a Lewis acid or base but note that everything is either a Lewis acid or base. See also the paragraph immediately above.

10. Applicant states on page 17 that it is without foundation to state that all materials are either acids or bases is without foundation. This statement is without foundation and see for instance paragraph 9 above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas A. Wille whose telephone number is (571) 272-1721. The examiner can normally be reached on M-F (6:15-2:45).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Douglas A. Wille
Primary Examiner